

PROJECT NAME: Testing the Effect of a Coal Additive on Boiler Efficiency and Emissions

RECIPIENT: Ferox LLC

LOCATION: Orem, UT

PURPOSE: Ferox LLC proposes to conduct, in conjunction with Brigham Young University (BYU), a rigorous, pilot-scale, empirical study of the effect of its dry-powder fuel additive on the characteristics of coal combustion in two common types of coal-fired boilers. By evaluating the effect of its organo-metallic additive on coal-fired boiler efficiency, durability, and emissions output, Ferox and BYU will contribute to the scientific understanding underpinning our national policy on clean air and energy security, which is calling increasingly for the development of cleaner and more cost-effective ways to generate steam and electricity from the nation's abundant coal reserves. The conclusions gathered from the project will also provide valuable information to Congress and the U.S. Environmental Protection Agency as they move toward regulating emissions of greenhouse gases (GHGs) and hazardous air pollutants (HAPs) from coal-fired boilers -- both those boilers used to generate electricity for sale to the grid and those used to power manufacturing plants. Finally, the project will provide guidance to the many states that are already working to find ways to impose further affordable controls on the various sources of conventional air pollutants such as sulfur dioxide (SO₂) and nitrogen oxide (NO_x), especially coal-fired boilers. Based on scientific theory and preliminary data, Ferox's fuel additive appears to offer a highly affordable and cost-effective way to improve boiler efficiency and reduce emissions of GHGs, HAPs, SO₂ and NO_x, primarily through more complete combustion of the full range of hydrocarbons in coal.

The funds would be allocated to complete a five-phase test of Ferox fuel additives, including:

- **Scoping Analysis and Development of Test Plan.** Ferox and Chemical Engineering professors at BYU would conduct preliminary test runs to scope out potential performance parameters and operational problems, and then develop a detailed test plan based on such preliminary data. Key preliminary tasks include: (a) the selection of a coal type and supply; (b) confirmation of the optimum treatment ratios as between the fuel and the additive for each of the combustors; (c) the length of treatment time over which performance might vary; and (d) optimum methods for introducing the additive into the fuel.
- **Baseline Testing, Data Summary and Analysis.** Ferox and BYU would conduct the testing to establish baselines. They would then summarize and analyze the data.
- **Fuel Additive Testing.** Ferox would introduce the additive into the fuel and conduct testing in accordance with test plan.
- **Data Analysis.** Ferox and BYU would analyze the data, in part to determine whether further testing is necessary to elucidate the results.
- **Report.** Chemical Engineering professors from BYU would draft a detailed study report, with a view toward public dissemination in a peer-reviewed journal. The report would recommend any further studies, as may be appropriate.

AMOUNT: \$1,000,000